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# PHYSICAL ELECTROCHEMISTRY DIVISION (PED) NEWSLETTER

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May 2005

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Division Website: [www.electrochem.org/divisions/ped.htm](http://www.electrochem.org/divisions/ped.htm)

## Division Officers (2003-2005)

**Chair:** Dr. Viola Birss  
birss@ucalgary.ca

**Vice-Chair :** Dr. Gessie Brisard  
Gessie.Brisard@USherbrooke.ca

**Secretary-Treasurer:** Dr. Petr Vanysek prior to August 2004  
Dr. Viola Birss acting Secretary-Treasurer since Aug. 2004

### **Members-at-Large:**

Dr. Zoltan Nagy nagy@anl.gov  
Dr. Michael Mirkin Michael\_Mirkin@qc.edu  
Dr. Ingrid Fritsch ifritsch@uark.edu  
Dr. Greg Swain swain@chemistry.msu.edu  
Dr. Robin McCarley tunnel@lsu.edu  
Dr. T. Zawodzinski taz5@po.cwru.edu  
Dr. Hugh DeLong hugh.delong@afosr.af.mil  
Dr. Hubert Gasteiger hubert.gasteiger@gm.com

### **Advisor to the PED:**

Dr. Jean Lessard (until spring 2005) Jean.Lessard@Usherbrooke.ca

**Newsletter Editor :** Petr Vanysek prior to August 2004

*Viola Birss since August 2004*

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## **Recent Activities**

### **Symposia**

During 2004, the division sponsored or co-sponsored 12 symposia at the Spring Meeting in San Antonio, and 11 symposia in Honolulu in the fall. The 2005 Spring meeting will be in May in Québec City, where the division will be sponsoring and cosponsoring 12 symposia. In October 2005, the division will sponsor or cosponsor 9 symposia at the Los Angeles Fall Meeting. The list of these symposia and call for papers appear later in this newsletter.

## Student Travel Awards

### Quebec City, May 2005

Six students received travel awards for the 2005 spring meeting in Québec City. They are listed below along with their University affiliation and their research supervisors. Their photos will appear in the next PED Newsletter.

Bernard John V. Tongol (Tohoku University, Dr. Christina A. Binag)

Nicoletta Ditaranto, (Universita di Bari, Dr. L. Torsi)

Jianer Bao (Penn State, Dr. Digby Macdonald)

Anne Fischer (Michigan State University, Dr. Greg Swain)

Jie Li (University of Guelph, Dr. J. Lipkowski)

Padhmodhbhava Yoga Narasimhan (University of Arkansas, Dr. Ingrid Fritsch)

### Honolulu, October, 2004

- 4 awards were given at the fall 2004 meeting in Honolulu.



Mr. Sasaki Isao, Georgia Institute of Technology (Dr. J. Janata advisor), presented a talk in symposium AD1 (Physical Electrochemistry General Session), entitled “Tuning of Work Function of Polyaniline Films for HCN Gas Sensors”



Ms. Lauren Webb, California Institute of Technology (Dr. Nathan Lewis advisor) presented a talk in symposium Q2 - Fundamental Science and Technology of Photofunctional Interfaces, entitled “Chemical Characterization and Charge Carrier Behavior of Alkylated Crystalline Silicon(111) Surfaces”



Mr. Ashutosh Tewari,  
Pennsylvania State University (Dr.  
Mirna Uquidi-Macdonald advisor),  
presented a talk in symposium X2  
– Membranes and Separators for  
Fuel Cells and Batteries, entitled  
“Polymeric Membranes for Carbon  
dioxide Separation in Alkaline Fuel  
Cells”



Mr. Christopher Burba ,  
University of Oklahoma (Dr.  
Roger French advisor), presented  
a talk in symposium D1 –  
Intercalation Compounds for  
Battery Materials, entitled  
“Vibrational Spectroscopic  
Investigation of Li Extraction  
from Monoclinic and

The following students received travel funds to participate in the 14th International Symposium held at the Fall Honolulu Meeting:

Norifumi Asahara, Kyoto Univ.

Severine Bellayer, NIST

Andreas Boden, Royal Institute of Technology, Sweden

Giovanni D'Andola, Imperial College

Slobodan Gadzuric, University of Novi Sad, Serbia & Montenegro

Seiichi Imakura, Kyoto Univ.

Takahiro Kawakami, Kyoto Univ.

Martin Keppert, Norwegian Univ. of Science and Technology

W. Matthew Reichert, Univ. of Alabama

Richard Swatloski, Univ. of Alabama

Hiroyuki Tokuda, Yokohama National Univ.  
Kristin Vasshaug, Norwegian Univ. of Science and Technology  
Kosuke Yamamoto, Kyoto Univ.

**San Antonio, May, 2004**

One travel grant was awarded for the spring 2004 Meeting in San Antonio



Maire O'Connor, Dublin City University (Dr. Malcolm R. Smyth advisor), presented a talk in Symposium X1- Sensors based on nanotechnology, entitled "Single-wall carbon nanotube forests"

**The Chair of the Division, Viola Birss, with the Student travel Awardee, Maire O'Connor at the San Antonio meeting.**

## Max Bredig Award

This award was established in 1984 to "recognize excellence in molten salt chemistry research." It is awarded biannually and is sponsored by ARCO Metals Company and the Aluminum Company of America. The award winner is presented with a scroll and a cheque for \$1500. A lecture is given in the International Molten Salt symposium, sponsored by the PED. Nominations are due by Dec. 1, 2005 and should be sent to: Hugh DeLong

([hugh.delong@afosr.af.mil](mailto:hugh.delong@afosr.af.mil))



Marcelle Gaune-Escard was presented with the Max Bredig award at the Fall 2004 meeting in Honolulu. She is currently director of research at the Ecole Polytechnique Universitaire de Marseille, Institut Universitaires des Systèmes Thermiques Industriels, CNRS-UMR 6595. She is working in the field of engineering sciences and has been in charge of the Thermodynamics of High Temperature Liquids group at CNRS-UMR over the last 25 years.

## The 2005 David C. Grahame Award goes to

### Prof. Henry White from the University of Utah



Henry White will be presented at the Spring meeting in Quebec City with the 2005 David C. Grahame Award for Physical Electrochemistry. This prestigious award has been given to Henry for his research in experimental and fundamental electrochemistry. This award was established in 1981 to "*encourage excellence in physical electrochemistry research.*" It is sponsored by General Electric and the Ford Foundation.

## **UPCOMING SYMPOSIA**

**207th Meeting – Québec City  
May 15-20, 2005**

**D1. Nanoscale Aspects in Electrochemical Surface Modification and Corrosion**

*(Corrosion/Electrodeposition/Physical Electrochemistry)*

**I1. Surfactant and Additive Effects on Thin Film Deposition and Particle Growth**

*(Electrodeposition/Physical Electrochemistry)*

**M1. Processes at the Compound-Semiconductor/Solution Interface**

*(Electronics/ Physical Electrochemistry)*

**O1. Fuel Cells from Materials to Systems**

*(Energy Technology/Battery/ Physical Electrochemistry)*

**T1. Modeling of Electrochemical Systems**

*(Industrial Electrolysis & Electrochemical Engineering/ Physical Electrochemistry)*

**V1. Nanostructured Materials for Energy Storage and Conversion**

*(New Technology Subcommittee/Fullerenes, Nanotubes and Carbon Nanostructures/Dielectric Science & Technology/Electrodeposition/Energy Technology/ Battery/ Physical Electrochemistry)*

**Y1. Physical Electrochemistry General Session**

**Y2. Diagnostic Methods for Monitoring Fuel Cell Processes**

**Y3. Electrocatalysis**

**Z1. Biophysical Electrochemistry, in Honor of Katsumi Niki**

*(Physical Electrochemistry/Organic & Biological Electrochemistry)*

**AA1. Nanostructured and Functionalized Conducting Polymer Films and Related Materials**

*(Physical Electrochemistry/Sensor/Corrosion)*

**AE1. Impedance-Based Sensors**

*(Sensor/ Physical Electrochemistry/Corrosion)*

**208th Meeting - Los Angeles, California**  
**October 16-21, 2005**

The Executive committee of the Physical Electrochemistry Division cordially invites you to participate at the fall meeting of the ECS, which will be held October 16-21, 2005 in Los Angeles, California. There will be five symposia where the Physical Division is either the organizer or the lead co-organizer and four symposia, on which the Physical Electrochemistry Division participates as a co-organizer.

**X1. Physical Electrochemistry General Session**

**X2. Durability and Reliability of Low-Temperature Fuel Cells and Fuel Cell Systems**

**Y1. Three-Dimensional Micro- and Nanoscale Battery Architectures**

*(Physical Electrochemistry/Battery/Industrial Electrolysis and Electrochemical Engineering)*

**Z1. Molecular Structure Effects in Heterogeneous Electron Transfer Kinetics**

*(Physical Electrochemistry and Organic and Biological Electrochemistry)*

**C1 Hydrogen Adsorption: Theory and Materials**

*(Battery/Energ. Techn/ PED)*

**P1 5<sup>th</sup> International Symposium on Proton Exchange Membrane Fuel Cells, in Honor of Supramaniam Srinivasan**

*(ET/PED/Battery/IEEE/New Tech Subcom)*

**Q1 Solid State Ionic Devices IV (High Temp Mat/ Sensor/Battery/PED)**

**S1 Environmental Electrochemistry (IEEE/PED/OBE/Sensor)**

**AB1 Sensors based on Nanotechnology II (Sensor/PED)**

## 209th Meeting - Denver, Colorado May 7-12, 2006

The Executive committee of the Physical Electrochemistry Division cordially invites you to participate at the spring meeting of the ECS, which will be held May 7-12, 2006 in Denver, Colorado. There will be five symposia where the Physical Division is either the organizer or the lead co-organizer.

### 1. Physical Electrochemistry General Session

*(Physical Electrochemistry)*

Papers concerning any aspect of physical electrochemistry not covered by topic areas of other specialized symposia at this Meeting are welcome. Contributed papers will be programmed in some related order, depending on the titles and contents of the submitted abstracts. Abstracts, suggestions and inquiries should be sent electronically to the ECS Headquarters Office and to the Session Organizer: **Dr. Hugh DeLong** [hugh.delong@afosr.af.mil](mailto:hugh.delong@afosr.af.mil)

### 2. Electrochemistry of Novel Materials

*(Physical electrochemistry)*

This symposium will cover a wide range of studies on the electrochemical properties, preparation, characterization, responses and applications of novel materials. Examples of the types of materials consistent with the vision of this symposium are: dendrimers and polymers, films (thick, thin and self-assembled monolayers), materials of direct interest in analytical and electronic devices (ceramic, silicon, polymer, glass, etc), nanoparticle and nanostructured materials, electrocatalysts (metallic, non-metallic or modified materials), magnets, ion and proton conductors, and glasses and amorphous media. Papers dealing with new materials, materials already known but prepared by new processes, and materials already known but used in non-traditional areas of electrochemistry will be accepted.

Abstracts, suggestions and inquiries should be sent electronically to the ECS Headquarters Office and to the organizers: **Christina Bock** ([Christina.Bock@nrc-cnrc.gc.ca](mailto:Christina.Bock@nrc-cnrc.gc.ca)); Ingrid Fritsch ([ifritsch@uark.edu](mailto:ifritsch@uark.edu)) and **Benoit Marsan** ([marsan.benoit@uqam.ca](mailto:marsan.benoit@uqam.ca))

### **3. Electroanalytical Chemistry and Beyond: Symposium in Honour of Robert Osteryoung**

*(Physical Electrochemistry)*

This symposium is being organized to honor the memory of Professor Robert A. Osteryoung. Professor Osteryoung's passing in 2004 was a tremendous loss to the field of physical electrochemistry. For over half a century Professor Robert A. Osteryoung sought to extend the frontiers of electrochemistry with contributions spanning the gamut from technique development to instrument design and automation. Professor Osteryoung played a key role in the development of chronocoulometry and his groundbreaking innovations transformed pulse voltammetry from a collection of quaint techniques into a sophisticated suite of powerful electroanalytical methods routinely capable of tackling complex chemical problems. Throughout his life Professor Osteryoung also championed the use of computers to automate, control, and analyze electrochemical experiments. All interested friends and colleagues are invited to submit abstracts in topics to which Professor Robert Osteryoung contributed.

Abstracts, suggestions, and inquiries should be sent to the ECS headquarters office and to the symposium organizers: **Robert Mantz**, AFRL/MLBT, 2941 Hobson Way, Bldg 654 Room 136, Wright-Patterson AFB, OH 45433-7750, (937) 255-2199, Email: robert.mantz@wpafb.af.mil; **Paul Trulove**, Chemistry Department, US Naval Academy, 572M Holloway Rd, Stop 9B, Annapolis MD 21402-5026, (410) 293-6622, Email: trulove@usna.edu; **Peter Pickup**, Department of Chemistry, Memorial University of Newfoundland, St. John's, NF, A1B 3X7, CANADA, (709) 737-8657, Email: pickup@mun.ca; **Malgorzata Ciszowska**, Department of Chemistry, Brooklyn College, CUNY, 2900 Bedford Ave., 351 New Ingersoll Hall, Brooklyn, NY 11210-2889, (718) 951-5456, Email: MalgCisz@brooklyn.cuny.edu.

### **4. Direct Methanol Fuel Cells**

*(Physical Electrochemistry)*

The symposium will focus on the direct methanol fuel cell (DMFC) science and technology, from the modeling, through materials development and characterization to fuel cell stacks and systems. In addition to papers on DMFC science and technology, submission of contributions to address various aspects of

low-temperature direct fuel cells using other fuels than methanol or hydrogen (e.g., higher alcohols and ethers) is also strongly encouraged.

Specific topics of this symposium will include among others: (i) progress in electrocatalysis of methanol oxidation and oxygen reduction; (ii) Nafion<sup>®</sup>-based and non-Nafion<sup>®</sup>-alternative membranes for improved DMFC performance; (iii) design and optimization of membrane-electrode assemblies for higher energy conversion efficiency and/or power; (iv) catalyst, membranes, fuel cell and fuel cell system modeling; (v) development of novel tools for the cell performance diagnostics; (vi) performance durability and mitigation of performance losses; (vii) design and demonstration of DMFC stacks, subsystems and complete power systems in various power ranges.

Abstracts should be submitted on the ECS webpage and copies should be e-mailed to the organizers: **P. Zelenay**, Los Alamos National Laboratory, MST-11, MS D429, Los Alamos, NM 87545, USA, Tel: 505.667.0197, Fax: 505.665.4292, E-mail: [zelenay@lanl.gov](mailto:zelenay@lanl.gov); **S. Gottesfeld**, Mechanical Technology Inc., Albany, NY 12205, USA, Tel: 518.533.2204, Fax: 518.533.2223, E-mail: [sgottesfeld@mechtech.com](mailto:sgottesfeld@mechtech.com); **C.-Y. Wang**, The Pennsylvania State University, 338A Reber Bldg, University Park, PA 16802, Tel: 814.863.4762, Fax: 814.863.4848, E-mail: [cxw31@psu.edu](mailto:cxw31@psu.edu); **A. Wieckowski**, University of Illinois Urbana-Champaign, Department of Chemistry, Box 56-5, Urbana, IL 61801, USA, Tel: 217.333.7943, Fax: 217.244.8068, E-mail: [andrzej@scs.uiuc.edu](mailto:andrzej@scs.uiuc.edu).

## 5. Molecular Modeling of Electrochemical Systems

*(Physical Electrochemistry/Organic and Biological Electrochemistry)*

Papers are solicited from all areas of molecular level modeling of electrochemical systems. Specific methods and topics include but are not limited to: (1) ab initio (QM, AIMD, etc) modeling of electrocatalysts, electrolytes, surfaces, double layers, etc; and (2) classical (MM, MD, MC, etc) modeling of electrochemical processes and material structures. Systems of interest include: batteries, fuel cells, etc, and applications include: electrosynthesis, sensing, magnetic and nano-structured materials, etc.

Abstracts, suggestions and inquiries should be sent electronically to the ECS Headquarters Office and to the organizers: **Steven Paddison** e-mail [paddiss@email.uah.edu](mailto:paddiss@email.uah.edu); **Shelley Minteer** e-mail : [mintees@slu.edu](mailto:mintees@slu.edu) ; **Albert Fry** e-mail [afry@wesleyan.edu](mailto:afry@wesleyan.edu)

## **6. Electron transfer reactions at organic/metal interfaces: from molecular monolayer modified electrodes to buried polymer metal interfaces**

(Physical Electrochemistry)

Electron transfer reactions (ETR) at interfaces between metals and organic materials play an important role in many applications: in the study of bioelectrochemical processes by mimicking the involved ETR at suitably modified electrodes, in organic based photovoltaic cells or in polyelectrolyte based fuel cells, and especially oxygen reduction at the buried interface may lead to the unwanted electrochemically driven delamination of polymer coatings from metals or the degradation of encapsulated microelectronic devices.

The symposium on “Electron transfer at organic/metal interfaces” is intended to bring together researchers from all these different areas and to stimulate an exchange of ideas. The aim is to find strategies on how to describe ETR processes as a function of well definable interface parameters. For instance, development of novel coating systems is hampered by the necessary long-term testing of their delamination performance tested, since for reliable computer simulation of the electrochemically driven interface degradation too little is known yet about the kinetics of oxygen reduction at the buried interface. Questions of direct relevance are how the electric field at the polymer/metal interface can be described, how it is affected by incorporation of ions and how ETR is influenced by the molecular structure at the interface. Electrochemists studying ETR at molecular monolayer modified electrodes have a more direct access to these questions, as the molecular structure of their interfaces is well known and tunable.

Areas of interest include:

- 1) Fundamental studies on electrochemical reactions at polymer/metal interfaces: Kelvin Probe, impedance spectroscopy, differential pulse voltammetry,..
- 2) Characterization of polymer/metal interfaces
- 3) ETR at hydrogel, polyelectrolyte or oil covered electrodes
- 4) ETR at molecular monolayer (SAM, LB) modified electrodes

Theoretical approaches to the correlation of ETR with interface parameters are especially welcome.

Abstracts, suggestions, and inquiries should be sent electronically to the ECS headquarters and the symposium organizers:

**M. Rohwerder**, Max-Planck-Institute for Iron Research, Max-Planck-Str.1, D-40237 Düsseldorf, Germany, Tel.: +49-211-6792-442, Fax: +49-211-6792-218, E-mail: [rohwerder@mpie.de](mailto:rohwerder@mpie.de); E. J. Calvo, Molecular Electrochemistry, Departamento de Química Inorgánica, Analítica y Química Física, Universidad de Buenos Aires, Pabellon 2, Ciudad Universitaria, AR-1428 Buenos Aires, Argentina, Tel. 54-11-4576-3378/80 ext. 120, Fax. 54-11-4576-3341, E-mail: [calvo@qi.fcen.uba.ar](mailto:calvo@qi.fcen.uba.ar)

## **7. Impedance in electrochemistry: From analytical applications to mechanism speculations.**

(Physical Electrochemistry)

The purpose of this symposium is to bring together leading experts with different experimental and theoretical skills working in areas of electrochemical impedance and in other areas, where impedance is used as a tool. Impedance spectroscopy-based measurements represent a rich multidiscipline area of science that has been applied to important areas of research, such as 1. Analytical applications, 2. Determination of fundamental values of ion transport and electrode kinetics, 3. Studies of reaction mechanisms, 4. Corrosion studies and corrosion control; 5. Monitoring of properties of electronic and ionic polymers and coatings; 6. Measurements in energy storage, batteries, and fuel cell related systems; 7. Measurements of semiconductors, solid electrolytes, and electronic conductors; and 8. Studies of biological, biocellular, and biomedical materials.

The aim is to show the power of electrochemical impedance spectroscopy for analytical applications, both quantitative and qualitative, as well as its usefulness for the needs of physical electrochemistry, where the data analysis will seek fundamental interpretation. Both contributions with well understood interpretation and papers with tentative postulates of impedance data relationship to physical parameters will be considered.

Abstracts should be submitted electronically to the ECS meetings website. Suggestions and inquiries should be sent to the symposium organizer:

**P. Vanýsek**, Department of Chemistry and Biochemistry, Northern Illinois University, DeKalb, IL 60115, USA, Tel: 815.753.6876, Fax: 815.753.4802, E-mail: [pvanysek@niu.edu](mailto:pvanysek@niu.edu)

**2006 Joint International Meeting  
Cancun, MX  
October 29-November 3, 2006  
210th Meeting of The Electrochemical Society, Inc.  
XXI Congreso de la Sociedad Mexicana de Electroquímica  
Cosponsored by the Sociedad Iberoamericana de Electroquímica**

**Tentative Symposium for Cancun, Fall 2006 - to be co-sponsored by  
Mexican Division**

1. H<sub>2</sub> Generation and Storage - Paul Marupin (DOE), Michael Heben (NREL)
2. Molten Salts XV in Memory of Robert Osteryoung
3. Electroanalytical Chemistry and Sensor Systems Charles Henry (Colorado State)
4. Biofuels for Power Generation (to link with S. American interests) -
5. General Session H. DeLong
6. The electrode/electrolyte interface at the atomic and molecular level -M. Soriaga (Texas A&M), N. Batina (Mex)
7. Supramolecular electrochemistry – A. Kaifer (Miami), L. Godinez (Mex)
8. Nanostructured metal oxides and their application – P. Searson and G. Meyer (J Hopkins Univ), G. Oskam (Mex) - V. Birss and D. Scherson -

**211th Meeting - Chicago  
May 6-12, 2007**

**Suggested Symposia to be led by PED**

1. General Session –
2. Bioelectrochemical Aspects of Physical Chemistry -
3. Modeling of fuel cells and fuel cell systems

4. Electron Transfer Reactions at buried interfaces
5. Exploiting Magnets and Magnetic Fields in Electrochemical Systems and Devices
6. Spectroelectrochemistry

### **Future Meeting Dates**

Fall 2007	Oct 7-12	Washington DC
Spring 2008	May 18-23	Phoenix
Fall 2008	Oct 12-17	Honolulu
Spring 2009		SF
Fall 2009	Oct 4-9	Vienna Austria

### **RECOMMENDATION FOR DIVISIONAL NAME CHANGE**

The Physical Electrochemistry Division (PED) Executive Committee has recommended that the Division change its name from the "Physical Electrochemistry Division" to the "Physical and Analytical Electrochemistry Division". The list of points given below serve as the rationale for making this change, but the main reason for this recommendation is to recognize the numerous members of the PED whose main interests are more in the fundamentals of analytical, vs. physical, electrochemistry. Specifically, the Executive Committee has recommended this change because:

1. This would more correctly reflect the present mission and activities of the Division. Adding "Analytical" to the title would also serve to communicate our interests and activities to the uninitiated. Importantly, there would be no need to change the mission description or the PED Bylaws, as our interest in electroanalytical chemistry is already stated there.
2. The name change would also serve to align the Division with the headings (groupings) of papers in the Society Journal, which currently includes "Physical and Analytical Electrochemistry".

3. The name change would also align our Division name with the new publication, "ECS Transactions," as one of the proposed subject groupings is "Physical and Analytical Electrochemistry".
4. For new members who are active in electroanalytical chemistry and are unfamiliar with the ECS structure, it will be more obvious which Division to join.
5. Renaming our Division as proposed would not infringe on the activities or interests of the other ECS Divisions, including the Sensor Division, which has a primary focus on systems and devices, while our Division is directed much more towards fundamental issues.
6. The renaming of a Division has been done before in ECS for the purpose of broadening or clarifying the technical scope of a Division, which is the main rationalization or purpose of our recommendation to add "Analytical" to the name.

In accordance with the PED Bylaws, we are required to inform the PED Members of this recommendation to change the name prior to the vote. The vote will occur at our Annual Luncheon and Business Meeting on May 16, 2005, in Quebec City. If you have any comments or questions prior to the Annual Luncheon and Business Meeting, please send them by email to me at [birss@ucalgary.ca](mailto:birss@ucalgary.ca) Sincerely, Viola Birss Physical Electrochemistry Division Chair

# **PROPOSED SLATE OF OFFICERS FOR THE DIVISION 2005-2007**

Election will be held at the PED Business Lunch, Monday,  
May 16<sup>th</sup>, 12:15pm, Portneuf-St. Foy, 1st Floor, Hilton  
Québec City

**Chair** - Gessie Brisard

**Vice-Chair** - Hugh DeLong

**Secretary-Treasurer** - Paul Trulove

## **Members at Large –**

Daniel Belanger

Ingrid Fritsch

Hubert Gasteiger

Shelley Minter

Greg Swain

Tom Zawodzinski

